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EXPERIMENTAL MUSICAL INSTRUMENTS

FOR THE DESIGN, CONSTRUCTION AND ENJOYMENT OF NEW SOUND SOURCES

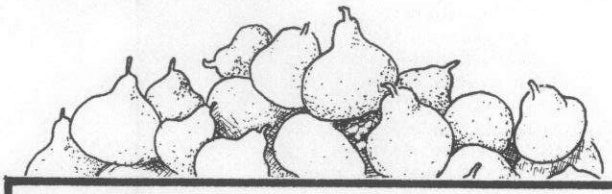
SOME QUESTIONS

Hello, readers. In this issue's editorial, I'll take the opportunity to ask some questions that have been in the back of my mind for a while. Here goes:

Question #1: Why are there so few experimental instrument builders exploring the possibilities of reed instruments and lip-buzzed instruments? There are many people working with strings; many people working with metal and other rigid materials to be bowed, struck or plucked; many people working with membranophones of various sorts; many people even doing wonderful things with water. And as for wind instruments, there are new and unusual flutes of all shapes and forms being made. But few are the people making variants of single or double reeds, or extending the possibilities of bugle-dom. Is there not to be an Adolphe Sax in our generation?

Question #2: With the need for a keyboard capable of greater intonational flexibility becoming more apparent every day, why doesn't someone build an electric continuous-strip keyboard? In my blissful ignorance of electronics, it seems to me that it should not be impossible to create at least a monophonic version of such a thing. The idea would be to have a full continuum of pitch (rather than a finite set of specific pitches) running low to high as one moves left to right on the continuous keyboard strip. Pressing the strip anywhere along its length would make electrical contact and produce the appropriate tone; drawing a finger along its length would produce a sliding glissando. As a visual guide it could have markings to pinpoint the location of specific pitches. Surely I am not the first to think of this. Does anyone care to build one?

Question #3: What elegant and exciting acoustic systems are there, waiting to be employed in clever new instruments, but never yet thought of? Once a new idea has arisen, it frequently strikes us that the solution was so simple, so readily apparent. The narrowness of our vision, creatures of habit that we are, prevented us from seeing what was right at hand. So, with that thought in mind, I can't help wondering, what are we missing still?



IN THIS ISSUE

LETTERS

I just want to thank you for the copy of your magazine, Vol II, No. 5, with the interesting article "Keyboard Alternatives." You're right, it was right up my alley!

I thought you summed it up very well. I am happy that you discussed the ancient organ, and mentioned that the early keyboards had all the keys on one plane or tier. On p. 5, you say "the physical layout of the keyboard can reflect relationships inherent in our musical systems..." and I very much agree. One of the reasons I favor the 6-6 keyboard is that it seems to reflect a 6-6 music theory that is more logical and more fair to all tonalities, without a definite channelling around C major.

EXPERIMENTAL MUSICAL INSTRUMENTS
Newsletter for the Design, Construction and Enjoyment of New Sound Sources

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SUBMISSIONS: We welcome submissions of articles relating to new instruments. Articles about one's own work are especially appropriate. A query letter or phone call is suggested before sending articles. Include a return envelope with submissions.

It is my belief that the early white-key-only organs of ancient and medieval times helped perpetuate the modes. That there are 7 tones in the C major scale, and the seven modes are heard when we start a scale on each of those 7 tones, when there are several other modal scales possible, is more than coincidental.

As soon as the 5 missing tones were added to the keyboard, we had full transposition and modulation, at least occasionally.

The interrelationship between the modes and the keyboard has never been discussed in any of the literature I have seen. You are the first person I've seen who has seriously touched on it.

Congratulations on a neatly printed magazine. I admire your open-minded philosophy, and your inclusion of a variety of information sources. Now, take that article about King Tut's Handbells -- that was really news to me! Those Egyptians certainly must have done things on a big scale ("scale," no pun intended).

Musical Six-Six Newsletter will put out one more issue, and that will be the last. I will be devoting most of my time to the new publication Music Notation News.

Thomas S. Reed

I continue to be thrilled with my subscription to EMI. I would love also to see more of the wonderful sound sculptures from around the country (or world). I've heard of some that I have not seen in EMI so I'm sure that there must be many more (too many to cover them all I'm sure).

Todd Saurman

From the editor: I feel the same way that you do -- I am aware of quite a few very interesting public sound sculptures and I'm sure there are many more out there. The idea of an article on the subject has been floating around here for a long time, but, given their wide distribution and EMI's modest budget, it would be hard to do a respectable job without severely limiting geographically the choice of sculptures represented. We would welcome contributions from readers on this subject, either letting us know about particularly interesting individual sound sculptures in their area or taking a broader view of public sound sculpture around the US and the world.

Happy coincidence: You put in the item about the curved keyboard of Mme Brouchallerie and its similarity to the Clutsam Keyboard (EMI Vol. II #5). It took quite a number of years for me to find more information about the Clutsam Keyboard, which turned up in a Dover reprint, I think it was, that the Glendale Library got of Dolge's book on piano building. That picture showed the key levers going way back -- i.e. the entire length of the wooden key.

The coincidence is that Jonathan [Glasier, editor of Interval Magazine] brought over the

proof-sheet for the new issue of **Interval**, and he features the special keyboard invented in 1932 by Harry Partch, which also is curved and whose keys are round affairs about the size of a quarter -- of course where Partch got the idea of round key-tops is obvious -- on old reed organs and some pipe organs the stop-knobs have such round white affairs set into them. So Partch's pattern will be the center-spread on the new issue of **Interval.**

Lowest note in the center? (Bob Phillips' design) My counterpart to that is the stringing of several of the chordal instruments of the Megalyra group -- one side of the Newel Posts and some others. If I want to have a major and a minor chord on one side of such an instrument, then I put the bass string in the middle and the major chord ascends from it on one side and the minor chord on the other. Then the performer can rapidly switch major to minor and back again without having to turn the instrument or reach for another of the four sides.

I've spent the last 20 years or more having to reiterate to the point of boredom that the main reason for building one's own instruments is to avoid the stifling standardization constraints of mass production. It is all too painfully evident to me what would happen if some big soulless manufacturer took over the rights to the Megalyra or Newel Post or Drone. I would **never** recognize their product as having any resemblance to my design and would have to disown it and refuse to let it be called anything like the names I have been using for said instruments.

One of the most valuable things about your having published EMI is that your magazine shows it is not necessary for the craftsman to imitate slavishly this or that factory product, such as the 19th century piano. You free people from this dreadful shocking frustrating **intimidation** by the commercial interests.

In a previous issue of yours, a subject came up that I had to wrestle with 50 and 40 years ago. Patents. (The Waterphone was patented; in the same issue, there are some allusions to inventors patenting or trying to patent something.) Way back in 1938 and again in 1947 and a few times since, I met inventors, two of whom held 150 patents each! Others who had been in patent development companies, and still other people who happened to be patent attorneys.

Some years ago I wrote a monograph entitled **Patent Absurdity** -- later I got out a Second Edition. I guess it's time for the Third Edition soon. Anyway it is available as xeroxes to order. When I was boy, you could at least theoretically get a patent for about $30 -- surely not over $100 for a do it yourself deal. Recently, the price has gone way out of sight -- you have to be a millionaire to afford it, since after the patent issues, additional sums must be paid to keep it in force, and you must defend it in court every time an infringer pops up.

I was only 18 when I had a patentable idea; when I was 22 I had several more, and I was on the point of consulting a patent attorney when I met some inventors holding several or many patents. They were the most miserable persons I have ever seen. Fortunately for me; I saved myself untold grief and financial ruin and bitterness. After 17 years the patent expires and the invention is Public Domain. So this means the manufacturers wait our not only 17 years but maybe 40. I could have lost other people's money as well as my own and been lonely and forsaken.

So the Megalyra Family of Instruments and my electronic affairs are not patented. I do have copyright on some of the designs. Much cheaper and you don't have to go to court. At age 69 what would I do with a patent anyhow? My chances of living 17 more years are about those of the proverbial Snowball in Hell.

On the positive side, this is the Golden Anniversary -- 50 years -- of my Electronic Keyboard Oboe, which still works, with many of the original parts. It was designed in a hotel room in San Francisco. Its first keyboard had bare copper strips. If you didn't play perfect legato, you got a shock. (Fortunately no sadistic music teacher found that out!) It makes as good tape recordings today as it did when first built. It was rebuilt several times. Had it been patented back then, it still would not have found a commercial market because it was ahead of its time which has now come.

If I had acquiesced 50 years ago in the Establishment Lifestyle, I would have died in the 1950s and wouldn't be writing you now nor playing those instruments now. Instead, I have outlived most of my enemies and am now free of their interference.

Ivor Darreg

Editor' note: The original pattern for the Partch keyboard design referred to at the start of the above letter is on display at the Making Music Exhibit at the California Crafts Museum, Ghirardelli Square, San Francisco, until April 5th.

CORRECTIONS

It doesn't rain but it pours. Three errors or omissions in recent issues of EMI have come to our attention:

In the October 1986 issue, the article entitled "The Mallet Kalimba" credited the design of this instrument to Darrell Devore. The instrument was actually conceived and originally built by Darrell Devore's musical colleague, Melvin Moss. Apologies to all concerned for the error.

In the February 1987 issue's review of the **Percussive Notes'** publication of early Deagan Company catalogs, no address for the publisher was given. The collection of catalogues is available for $5 from the Percussive Arts Society, Box 697, 214 W. Main St., Urbana, IL 61801-0697.

In the October 1986 issue's record review of **Sonde en Concert**, an incomplete address was given. For information on Sonde's performances, recordings and the like, Charles de Mestral of Sonde can be reached at 3912 rue de Mentana, Montreal, Quebec, Canada, H2L 3R8.

THE MUSICAL-ACOUSTICAL DEVELOPMENT OF THE VIOLIN OCTET

by Carleen M. Hutchins

Carleen Hutchins is an acoustician and instrument builder, and one of the central figures in the Catgut Acoustical Society. CAS promotes research into all aspects of violin acoustics through the **Journal of the Catgut Acoustical Society**, Symposiums and similar activities. It has been instrumental in refining the art of plate tuning, which is the careful individual tuning of the soundboard and back of the violin for particular resonances. Carleen Hutchins and members of CAS have also been working on the creation of a new family of violin-like instruments based upon the best possible design parameters, and that family is the subject of this article.

The **Violin Octet** consists of eight experimental instruments of the violin family designed and constructed on acoustical principles to carry the timbre, tone and playing qualities of the violin into seven other tone ranges from the tuning of the the bass to an instrument an octave above the violin.

The concept of a balanced consort of violins, just as there is a consort of viols, is not a new one, for we find a description of of eight "geigen" or violins, in nearly the same tone ranges as the **Octet** instruments in **Syntagma Musicum** (1619) by Michael Praetorius. In the museums of Europe one can see many violin-type instruments of various sizes that conceivably could have been part of such a family. In fact, Lowell Creitz, on a two year sabbatical in Europe, did find instruments approximating those of the **Octet** (Creitz, 1977, 1978).

The present effort to create a violin octet was brought into focus by Henry Brant, the composer, when he was at Bennington College. Brant came to me in 1956 hoping he could find some violin maker oddball enough to try to make him a set of violin-type instruments that would carry the tone and playing characteristics of the violin into seven other tone ranges -- one at approximately each half-octave from the double bass to an octave above the violin. Brant did not want the beautiful blending qualities of the viola or the cello or the husky sound of the bass. He wanted the clarity, brilliance, power and ease of playing of

THE VIOLIN OCTET. Shown from left to right: Baritone Violin, Small Bass Violin. Contrabass Violin, Tenor Violin, Alto Violin. On the floor: Mezzo Soprano and Treble violins.

Photo by John Castronovo

the violin on all four strings to be projected into the larger and smaller instruments.

BACKGROUND

At the time I had been working with Harvard Professor Emeritus Frederick A. Saunders, who had pioneered violin research in the USA during the 1930s and 1940s at the Harvard Laboratory and continued in his retirement. I had made my first viola mostly following the directions in Heron-Allen's classic treatise **Violin Making As It Was and Is** (Heron-Allen, 1895) and it was rated as the work of "a good carpenter" which was about my speed in 1949. Some friends introduced me and my viola to Saunders. He looked the instrument all over, blew in the f-holes, tapped around on the top and back and said "Young lady, I'll be interested in seeing your next one." At the time I hadn't planned to make a "next one" for all I wanted was one to play myself. But by 1950 I had had the opportunity of working under the supervision of Karl A. Berger, a Swiss violin maker with a shop in the Steinway Building near Carnegie Hall, and in the next few years had made several reasonable violas. Also I had made several experimental violas for Saunders to work with, cutting and changing the wood as he indicated. This involved making instruments with deep ribs, shallow ribs, flat tops and backs, high arches, tiny f-holes, large f-holes and the like to try to discover clues to some of the acoustical characteristics of the violin. On one viola with flat top and back we did more than 125 experiments, keeping careful records of the effects of the changes. This was the instrument where a channel to simulate the purfling groove, cut around the edges of the top and back, changed it from a poor sounding box to a reasonably good sounding viola.

To make a very long story short, by the time Brant came to me in 1956, I had done enough experimenting with moving violin and viola resonances up and down the scale and changing constructional features, so that within a half an hour's conversation, I agreed to try to do what Brant wanted. Later Brant and his friend Sterling Hunkins, the cellist, brought some existing instruments they had adapted -- a small size cello for the tenor range between viola and cello, and a child size violin strung an octave above the viola. These two instruments had the proper range, but left much to be desired in tonal qualities.

THE TEN YEAR PROJECT

THE SEARCH

The first problem to be faced in designing the new instruments was to try to find the distinguishing acoustical characteristics of the violin as different from those of the viola, cello and bass. This led to a search through records of several hundreds of tests made not only by Saunders (1875-1963), but by Herman Backhaus (1885-1958) and Hermann Meinel (1904-1977) in Europe during the 1930s and 40s, by John Schelling (1892-1979), a retired Bell Laboratories research director and cellist who was working with us, and by me. Finally one distinguishing characteristic emerged. In many fine violins, the two main resonances, so called "air" and "wood"*, lie very close to the frequencies of the two open middle strings -- the "air" near D 239Hz and the "wood" near A 440Hz. In fact, we found that these two big resonances were exactly on the two open middle strings of the Guarnerius del Gesu belonging to Jascha Heifetz that Saunders tested some years back. In the viola and cello these two resonances were found to be three to four semitones higher in frequency in relation to the tuning of the strings. For example, in the viola the "air" resonance is usually around the B to Bb above the open G string and the "wood" resonance around the F to F# above the open D string. In the basses which we could test, these two resonances were found to be even higher in relation to the tuning of the strings. Obviously the viola, cello and bass would have to be larger than the present ones. But how much?

A search was made for instruments that might have dimensions such that they could be adapted to have the desired parameters. One child's cello was found that had its "wood" resonance about right for our projected viola, but its "air" resonance was much too low because of the deep ribs. We were able to purchase this so that I could start slicing down the ribs a few inches at a time to try to bring the "air" resonance up to the open second string. This meant several rounds of taking the back off, sawing the ribs down, gluing the back on and checking for the position of the "air" mode. Calculations of the air cavity gave some indication of how much to cut off, but because of the flexibility of the box (compliance) the calculations were never accurate enough, so I had to cut and try. The desired resonanceplacements were finally achieved with the little cello (21 inches body length) looking like a very large, shallow viola!

THE DAUTRICH INSTRUMENTS

About this time we were most fortunate in learning of the work of a violin maker named Fred Dautrich who had lived in Torrington, Connecticut during the 1920s and had spent many years working to develop instruments that would "fill the gaps in the violin family." He described his work in a little booklet of this title and had succeeded far enough to have a demonstration of his five instruments played for Arturo Toscanini at Carnegie Hall in New York. I was able to locate his son, Jean Dautrich, who was kind enough to let me borrow and test the in-between instruments, a small bass tuned a fifth below the cello, a tenor, tuned a fourth above the cello, and a 20 inch viola played on a peg. Without the help of these instruments, the project would have taken at least another five years. Finally Jean Dautrich was willing to sell me the three instruments so that I could try to adapt them to our desired acoustical parameters. The small bass had the right placement of the

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*"Air" and "wood" are in quotes because we now know that each is a resonant combination of wood and cavity modes.

"wood" and "air" resonances, but the response was not particularly good. The viola had the right "wood" resonance, but the "air" resonance was too low because of the deep ribs. The instrument between viola and cello had its resonances placed about right, but did not have good tone quality. If Fred Dautrich had only had the benefit our technical information and our method of tuning the free top and back of the instruments before assembly, his life's dream could have been realized!

THE ACOUSTICAL-MUSICAL DEVELOPMENT

I was able to adjust rib heights and tune the free plates of the Dautrich instruments so that they not only had their resonances where we wanted them, but had good tone and playing qualities so that they were able to take their places in our new series. A small violin that Karl Berger had made as a "violino piccolo" a fourth above the violin was used in our first demonstration of the middle five. This left the big bass and small bass at the bottom of the range, and the instrument an octave above the violin to be developed from scratch. Even a large Prescott bass loaned by Brant did not have its resonances low enough for the large bass. By 1962 the middle five were ready for a trial run.

While I was working to get the actual instruments to have the parameters we wanted, Schelling was working on scaling theory for overall body length and other parameters for each new instrument. In this way we were able to project a chart with a curve of tuning frequencies versus body lengths so that it was possible to extend the curve at each end and say that the large bass should have a body length 3.6 times the length of the violin and the treble a body length of 0.75 of the violin length (Figure 1).

The big bass with a body length of 52 inches and an overall height of seven feet took three years to develop and construct. Without the help of Donald Blatter, a bass maker in Erie, Pennsylvania, who actually set up the wood for this big fellow, made the ribs and roughed out the top and back plates, the job would have taken even longer. Blatter also provided a nearly finished small size bass so that I could tune the plates and adapt it for the instrument between cello and bass tuning -- the small bass.

Henry Brant was delighted with the sound of the whole octet and composed a piece which he conducted in 1965 at the Young Men's Young Women's Hebrew Association on 96th Street in New York City as part of Max Pollikoff's program "Music in our Time," which was very well received.

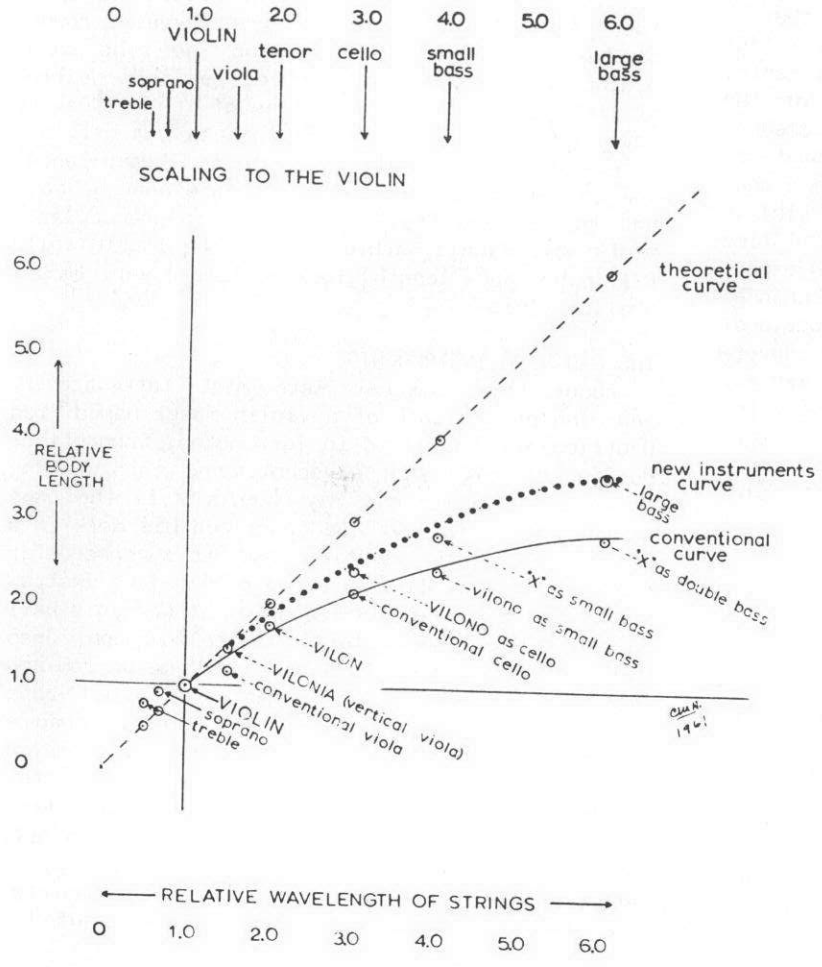

Figure 1

OVERALL DESIGN

With the eight instruments doing the musical job we had projected, the next step was the creation of an overall design characteristic so that the Octet would not only play properly, but look well as a balanced consort. We had been working with musicians who wanted a shorter string length on the big viola so they could use viola fingering. They wanted a longer string length on the tenor so fingering would be closer to cello mensure. (The term "mensure" refers to the proportioning of string, neck and fingerboard lengths). Bassists were willing to settle for a 46" string length, but no longer. A Stradivarius violin pattern was used as the basic design and projected into the other sizes. Many adjustments had to be made in basic outlines and overall mensures to accommodate player needs, while at the same time respecting basic violin parameters. For almost two years our living room walls were covered with cardboard outlines of each instrument so we could look at them as changes were made. (If one is not careful a poorly designed instrument can look very much like a fat lady with a string around her middle!)

THOSE WHO HELP

This whole development represents the work of many people. In the first full scale article I wrote about the Octet (Hutchins, 1967), I listed 180 names of those who had contributed in this development on way or another. They represented chemists, architects, electronic engineers, translators, editors, photographers, artists, lawyers, general consultants, secretaries, violin experts and makers, violinists, cellists, bassists, composers and conductors. In other words, people from a broad spectrum of the music world including some famous names of the 1950s and 60s were interested enough in the project to contribute their time and abilities. Funding for the project came largely from the Martha Baird Rockefeller Fund for Music, the Harriett M. Bartlett Fund of the Catgut Acoustical Society, Inc., two fellowships to me from the John Simon Guggenheim Memorial Foundation, and my own working time for ten years.

Today six sets of the Octet are completed except for one large 7' bass, which is well under way. Two sets have been sold abroad; one went to England where it spent three years at the Royal College of Music and one to the Swedish Academy of Music, which resides in the Stockholm Music Museum where the instruments can be on display as well as used for performances. A third set has just spent three years at the University of California, San Diego, under the direction of Bertram Turetsky, and is now with the Metropolitan Symphony Orchestra of Boston for a series of concerts. I have taken the Octet to over 150 lecture-demonstrations for college Physics and Music departments around the USA and Canada.

Musicians find that these new instruments have very exciting tonal characteristics: the clarity and sweetness of the high sounds of the soprano and treble violins, the power and projection of the mezzo violin and particularly the full dynamic range and clarity of the alto, tenor and baritone violins on all four strings. After hearing the alto (viola) in our first concert in 1965, Leopold Stockowski said :"That is the sound I have always wanted from the violas in my orchestra." William Berman, formerly violist in the N.Y. Philharmonic and professor at Oberlin Conservatory, who now lives in Seattle, has played the alto violin in orchestras and chamber ensembles all over the world for twenty years. Berman reports that whenever the conductor wanted more sound from the violas he could provide it, but that also he could play the alto in string quartets without overpowering the other instruments. Daniel Kolbialka tells us that he is finding the high sounds of the treble and soprano violins very rewarding in his music.

We found that having one baritone in the cello section and one large bass in the New Jersey Symphony greatly enhanced the sound of the two sections. A large bass, made by Hammond Ashley to our specifications is presently in the Seattle Symphony and Opera Orchestra. Ashley reports that when it was first introduced, the other bass players were very critical of having it in the section because the big bass could produce more sound than all the other basses together, but it is now well accepted. A bassist recently described the tone of the big bass as one "bassists only dream of."

The real problem for performers on these new instruments is that they are truly new instruments, not only in their sounds and overall dimensions, but also in the changed placement of their resonances giving different dynamics from those of the standard instruments to which the players are accustomed. Even expert professional performers find that it takes time in order to realize and be able to exploit the full potential in each of the new Octet instruments.

THE FUTURE

The whole project, which started as an interesting acoustical-musical experiment, seems to be getting a foothold in our musical world. Composers particularly are excited over the possibility of composing for eight octaves of balanced string tone, and instruments which have the clarity and power of the violin on all four strings so that they can be heard clearly through a thick musical texture or can speak pianissimo when desired. Several composer contests have been held and the Catgut Acoustical Society has over fifty pieces composed or arranged for the Octet. The Society has an illustrated brochure giving the musical and constructional features of each instrument (CAS, 1981) as well as a set of full scale drawings for the eight instruments with suggested plate tuning frequencies for violin makers, that can be purchased through the office. About two dozen of the individual instruments have been sold separately, particularly the Alto violin and the Baritone violin. These can be used in standard orchestral and solo repertoire.

Whether the Octet as a whole will eventually become a real part of the musical scene or whether some of the individual instruments will find their place is a matter for conjecture. Hopefully there will be enough players who will learn to play the instruments well, composers to compose for them effectively and audiences who will feel the thrill of the new sounds which the Octet instruments are capable of producing, so that the musical potential of the first family of orchestral instruments based on a consistent theory of acoustics can be fully realized.

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Creitz, Lowell, "The New and Old Violin Families -- An Organological Comparison," Catgut Acous. Soc. Newsletter #30, Nov. 1978.

Catgut Acoustical Society, Inc., Violin Octet Brochure, 1981.

INSTRUMENTS

MORE GOURDS

In **Experimental Musical Instruments'** October issue (Vol. II #3) we ran an article on instruments built by Minnie Black, who makes musical uncategorizables using the gourds from her garden. In the process of putting that article together we learned of the work of several other builders doing diverse and interesting work with gourd instruments. The whole subject was so engaging, and the response to Minnie Black's instruments so positive, that it seemed appropriate to run another article on the subject to show the fine work of some of those other builders as well.

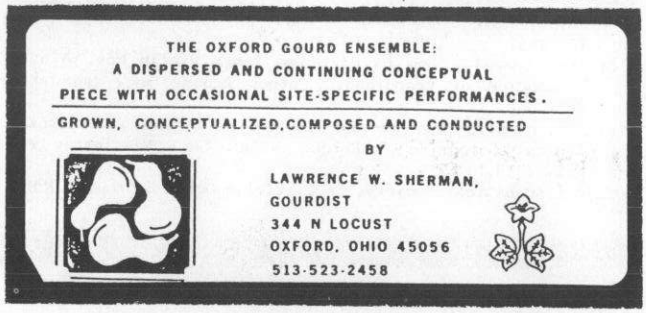
This is that second article. It features the work of four builders of gourd instruments, presented in photographs accompanied by their own written accounts of what they are doing. The four are:

Tony Pizzo, a long time builder who for the last eight years has been specializing in developing designs for available-material versions of world instruments. He is currently working on a book on that subject for Charles Scribner's Sons. For more information on his work he may be contacted at RR 1 Box 64, Lunenburg, VT 05906.

Lucinda Ellison, who makes finely crafted, finished and decorated kalimbas, shekeres, drums and bamboo flutes. For more information on her work or a free brochure, write her at PO Box 665, Jackson, MI 49204.

Matthew Finstrom, who has built and performed with new instruments as well as out-of-the-ordinary traditional instruments of all sorts. For more information on his work contact him at 1901 N. Ave Azahar, Tucson, AZ; (602) 743-9879 (phone calls preferred).

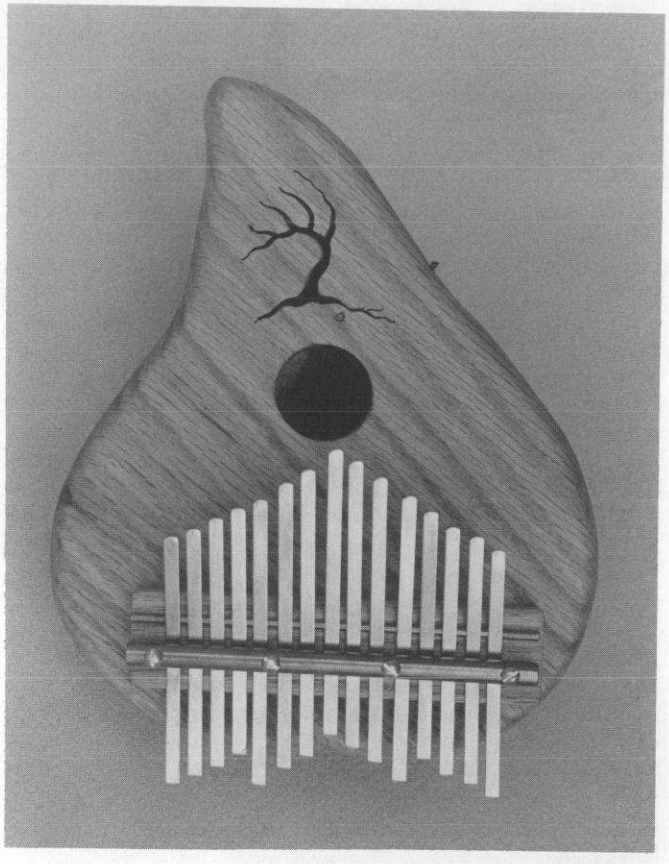
Lawrence Sherman, associate professor of educational psychology at Miami University, who uses gourds in the creation of objects both practical and aesthetic, with an emphasis on fine carving and decorating. Two galleries handle his gourd-crafted objects and musical instruments: Perucca Studio-Gallery, 121 W. High, Oxford, OH 45056; (513) 523-1333, and Willys-Knight Gallery, College Corner, OH 45003; (513) 523-2363. Larry Sherman's own business card (whose special significance is explained in his discussion of his work) is reproduced below:



Gourds truly are a great resource. They come in an astounding variety of sizes and shapes and lend themselves to countless diverse purposes. Growing and curing your own gourds is always rewarding and entertaining -- gourds have lots of personality. They are quite easy to cultivate if you have some sun and lots of space. If you are unable to grow them, they can be purchased from many sources. The best overall source for information on anything having to do with gourds is **The Gourd**, published three times a year by the American Gourd Society. It will tell you where to get cured gourds or gourd seed in the many varieties, and provide information on cultivation, curing and all manner of gourdcraft. It is available for $3 a year or $5.50 for two years from the American Gourd Society, PO Box 274, Mt. Gilead, OH 43338. The American Gourd Society also published a book in 1966 entitled **Gourds: Their Culture and Craft.** At the annual Ohio Gourd Show on October 3rd and 4th, 1987, there will be a special display devoted to gourd musical instruments of all sorts.

A word about the builders' accounts of their work: The four, being four very different people, each approached the task of writing very differently. Rather than seek a way to make a four such unmatched parts appear to fit together, they are simply presented here in their diversity and allowed to speak for themselves.

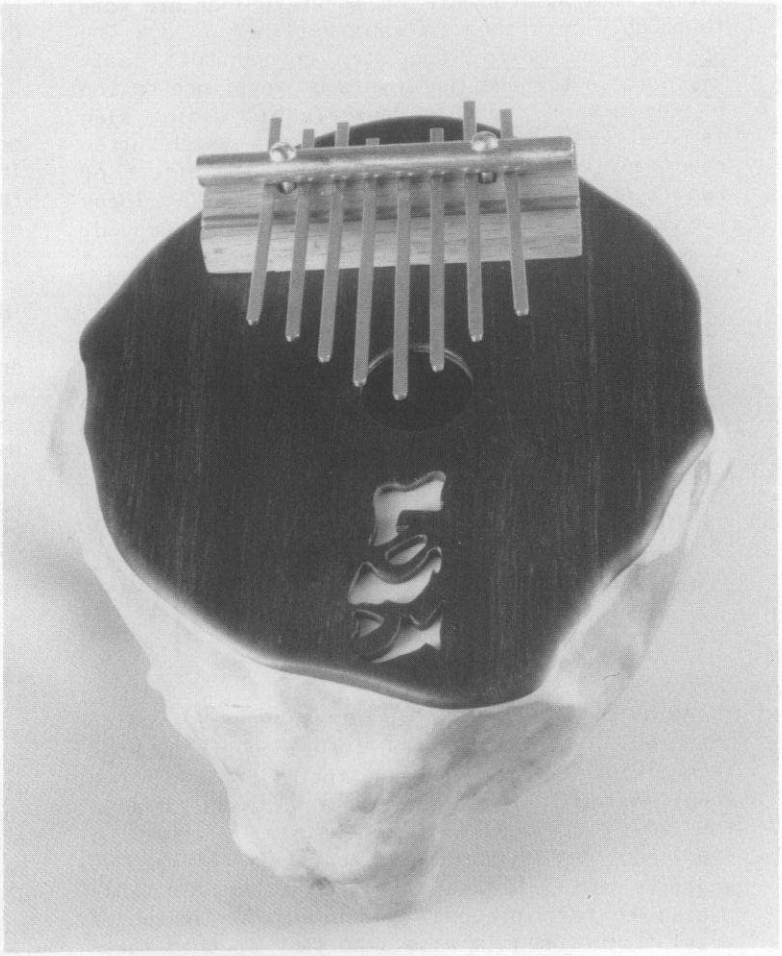
MBIRA BY LUCINDA ELLISON. The soundboard is Red Oak with a tree design cut out. Lucinda uses a jeweler's saw for this detail work and then underlays the design with stained glass. The glass, mirror, ivory or other materials sometimes used add color but don't affect the sound.



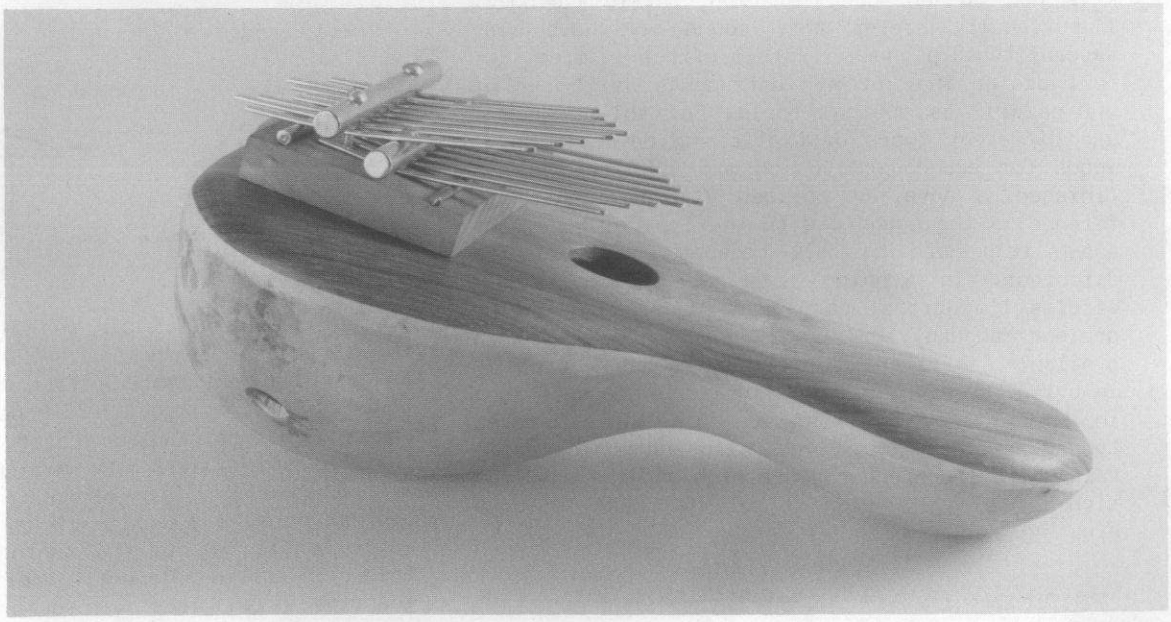
MBIRAS
Built by Lucinda Ellison
Article by Lucinda Ellison

For the past six years I've been building gourd musical instruments, my main focus being the African thumb piano, aka the kalimba. This instrument is by no means non-traditional to those who have enjoyed it for centuries throughout Africa, but to many here it is unusual. The gourds that I use for the sound chamber of the thumb pianos must be ideally suited to the purpose. Most of the ones I use come from Georgia and Alabama where the climate resembles that in Africa but the drive is much shorter. A good gourd is hard and dry and fairly dense. One too dense will limit the resonance of the thumb piano, for it's the gourd which vibrates the sound, more so than the soundboard. A gourd that is too thin won't be durable. I choose particular gourds for their surface designs and sculptural qualities as well as their technical capabilities. It's hard to say which shapes will sound best. I have tried thousands and each is different. I often can't tell if on a finished thumb piano it's the gourd, the wood of the soundboard, or the type of metal key that makes it sound the way it does. This element of surprise is an exciting part of making them. The gourds themselves are beautiful and unusual; each has its own feel and aura. The gourd is the essence of the instrument.

While the gourd defines the tone of the thumb piano, which is quite soothing overall, the tuning arrangement of the keys is quite flexible. Each gourd does have a certain range in which it will sound best so I set up a tuning (with anywhere from 8 to 30 keys) which creates a good balance from low to high notes. This may then be adjusted by slightly loosening the screws on the bridge and sliding the keys up or down. I arrange the keys with the low notes in the center and then alternate L-R-L-R up the scale. This is a Western adap-

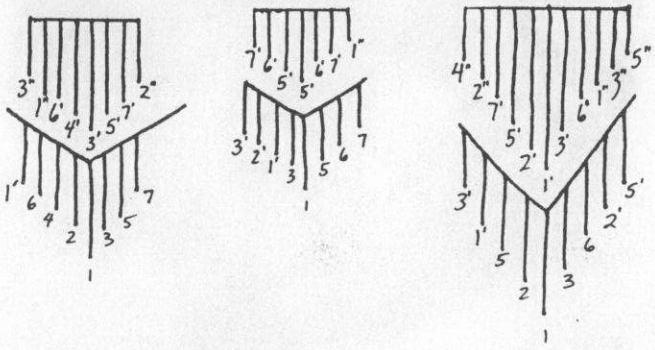


ABOVE: This lumpy maramka gourd fells wonderful in the hands. It's got a 1/8" ebony soundboard with a tribal lmask design underlaid with ivory. Tuned pentatonically.



This double decker arrangement lets smaller hands play a wide range of notes. The top and bottom levels are tuned separately. Padauk soundboard. The holes in the sides of the gourd may be opended and closed for a wah-wah sound.

tation from African mbiras, whose tunings are more thoroughly described in Paul Berliner's book The Soul of the Mbira. One step beyond this basic keyboard is to have two layers of keys, one on top of the other; a double decker. This design also is derived from traditional mbiras which often have many keys bent upwards giving the effect of two layers. This opens up a wide range of ideas for tunings; since the keys are so easily moved, almost anything is possible. A few are diagrammed here:



Aside from the positions of the keys being changeable, so too are the dimensions of the keys themselves. On big gourds that might support deep, resonant, low tones I put ¼" wide keys in the low positions. For quick high pitches on small gourds I use 1/8" keys. The remaining majority are 3/16". I have all my keys nickel-plated to help prevent oxidation. The gauge of metal that's used is also important as this makes a difference in the action of the keys and the sustain of the notes. Heavy keys are good for big gourds because they hold the lower notes better. These are harder to play however and you may need to develop calluses or use a thumb pick. The lighter gauge keys are easy to play but will sometimes have more of a buzz and a funky twang sound, especially if you like to play them hard and really wail on the keyboard. This isn't unpleasant though, in fact it's a desired effect for many African players who add bottle caps to the soundboard and pieces of bent metal around the keys just to add more vibration, rattle and buzz. I personally prefer this sound and have made several thumb pianos with this effect in mind.

I design many of my instruments as pieces of art as well as musical tools. For this reason I use different types of exotic and domestic hardwoods for soundboards which are 1/8" to ¼" when finished. I have not noticed a significant difference in the sound due to the type of wood, but again it's hard to tell because each gourd is different. In keeping with the thumb piano's origins I'm partial to African woods like a fine grained Mahogany, brilliant Padauk, or Ebony when available. I often embellish the soundboards by inlaying, burning, carving, or cutting out designs in them. Since my sales energies are directed toward national juried art fairs and music festivals where the standards are high and the competition is tough I design my work to appeal to both eye and ear.

FOUR GOURD RESONATED INSTRUMENTS
Built by Tony Pizzo
Article by Tony Pizzo

The following is a brief description of four gourd-resonated instruments which I have made. Three of these -- the tamboura, the giant bow and the berimbau are available-material versions of existing world instruments, while the double strung bow is a design adaptation of my own.

THE TAMBOURA

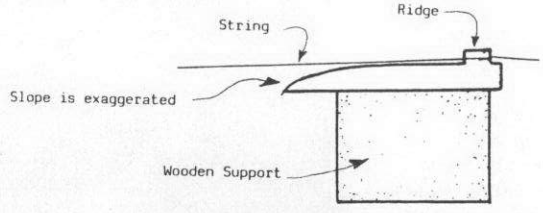
The body of this version of the Indian string drone is made from a six foot length of thin-walled 4" diameter PVC sewer pipe plugged at each end with a pin block cut from a piece of 2"x4". The soundboard is a 4"x19" length of 1/8" birch ply friction fit into a 19" long relief cut made in the PVC. The cut is 1" deep and the relief cut itself begins 7" from the hitch pin end of the body. The tamboura bridge (details below) is set directly above the large resonator and is located about 12" from the end of the instrument. Overall length of the four steel strings (nut-to-nut) is 66". I used #4 wire for all the strings. Figure 2 gives a detailed view of the business end of the instrument.

I used a 15" diameter gourd for the main resonator, and a 10" diameter gourd for the upper resonator. I cut 3½" diameter resonator holes on the bottom of each gourd. Each gourd was attached to a hole cut in the underside of the tube with plenty of fiberglass auto body filler which I then surformed smooth. A good steady supplier of gourds is Charlie Cannon, Rt 1 Box 49, Hobgood, NC 27843. The Gourd (listed elsewhere in this issue) is also the prime resource for gourd seed, growing info and suppliers of seasoned gourds.

The nuts at either end of the tamboura are crescent-shaped strips of birch ply cut ¼" high and following the curve of the tube in cross section. I installed four zither pins in the recess which I cut into the pinblock at the upper end of the tamboura.

The heart of the tamboura is the wide curved bone bridge on which the strings sit.

TAMBOURA BRIDGE



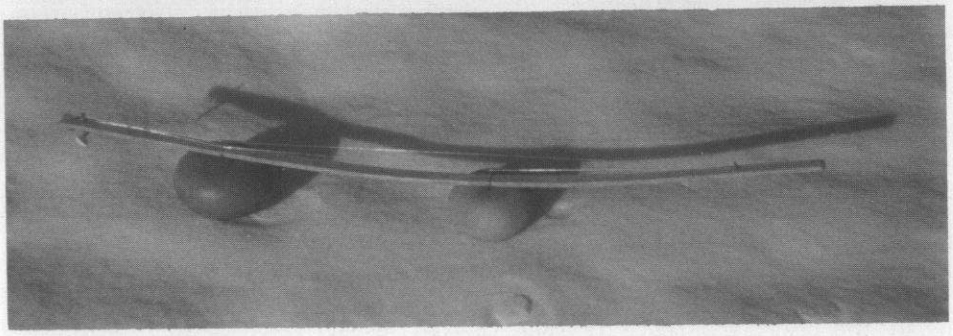
A ridge on the hitch pin end of the bridge holds the strings in place so that they can "buzz" on the 1" long smooth bone face that makes up the rest of the bridge. The bone surface of the tamboura bridge must be carefully filed down so that the string will make only the barest contact with the bridge face when it is plucked. This process of filing the gentle slope into the bone which trails off at the tuning pin end of the bridge is called "djovari," and is too involved to describe here. It's a process which can most

ABOVE RIGHT: Tamboura built by Tony Pizzo.

BELOW RIGHT: Double Strung Bow.

BOTTOM LEFT: A closer view of the tamboura bridge.

BOTTOM RIGHT: Three forms of musical bow: at left, the Giant Bow; at center, the Berimbau; and at right, the Double Strung Bow.

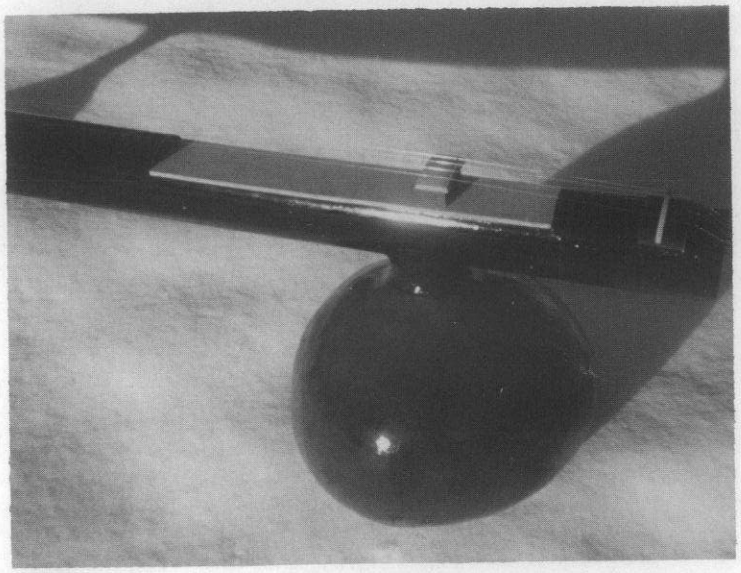


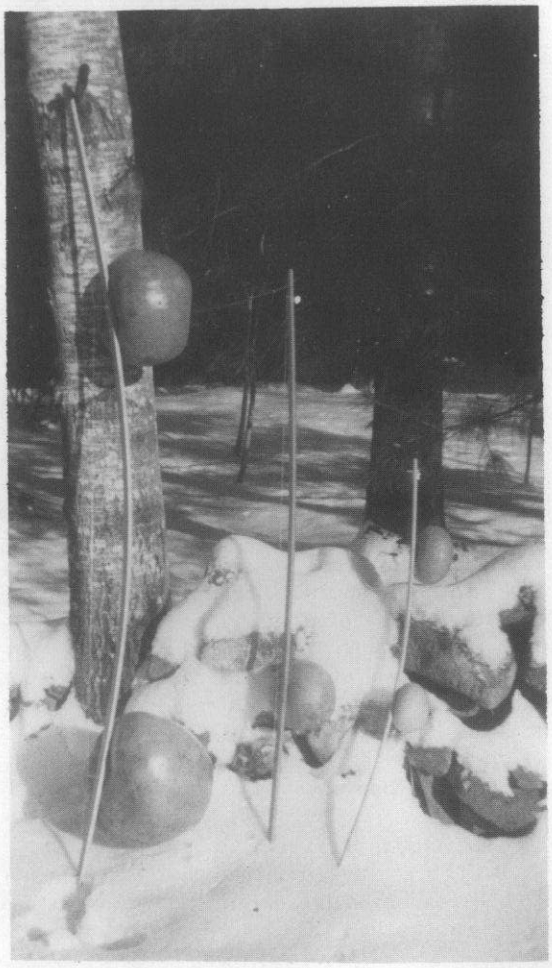
realistically be learned through trial and error. If you're in a hurry to start droning, I'd recommend that you purchase a tamboura bridge from a supplier of Indian instruments. Since these sources vary in longevity, I can recommend that you contact the granddaddy of ethnic instrument suppliers -- The Music Inn in NYC (164 W 4th St., 10014; (212) 243-5715), which usually has these bridges in stock.

Some Thoughts: My work with tambouras is just beginning, and is based primarily on research in catalogues, brief written descriptions and some viewing through the glass in museums. I'd appreciate hearing from anyone who has had experience building tambouras, doing djovari or has located any supply sources other than those mentioned above.

Based on my work to date, here are some directions which people interested in available material tambouras may wish to take:

Tamboura body length, string length and the





length of the soundboard insert are all variable. Since it seems the the string "buzzes" more easily as its length increases, discretely increasing all of these elements may be of value.

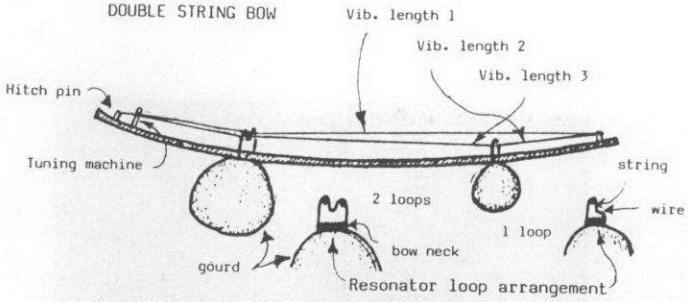
What is the effect of substituting large metal cans for the gourd resonators? Of using no external resonators at all? What is the effect of placing the bridge directly on the PVC tubing and eliminating the separate soundboard entirely?

I've had some luck making tamboura-type bridges by slightly flattening out arc-shaped sections cut from thin-walled aluminum tubing and inserting them under steel strings. This technique could be developed for tamboura bridges. Can buzzing bridges be made from the same PVC used for the tamboura?

THE DOUBLE STRUNG BOW

This adaptation of the mouth-resonated musical bow provides the player with three playable sections of the same steel string.

The string begins at a hitch pin at the tuning machine end of the bow, passes around the shaft of the machine (which serves as the bridge), and through one of two wire loops attached to the first resonator gourd (6" diameter) at the upper end of the bow. From there it runs to the far end of the bow and around a metal pin which determines vibrating length 1 The string continues to the second wire loop in the first gourd and on to the tuning machine at the upper end of the bow.



Both resonators are adjustable for position along the length of the bow, so the string length and tension of all three vibrating areas are adjustable. These areas may be plucked, bowed or struck berimbau-style in any combination, and the bow can be mouth and/or gourd resonated. The bow is made from a 47" length of springy red oak.

THE BERIMBAU

This version of the large Brazilian musical bow is made from an 8" diameter gourd which runs along a 5' long lemonwood stave by means of a wire loop which passes from the gourd and over the string back to the gourd. String vibrating length and tension are determined by moving the gourd up and down the length of the string. The string is struck with a stick held in one hand while the note (open or closed) is made by pressing a coin or tube against the string with the other hand, which at the same time holds the resonator gourd against the body.

THE GIANT BOW

This bow was inspired by a beautiful giant double-resonated bow built by Bill and Mary Buchen of Boneworks and Sonic Architecture.

BALAFON, VINA & MVET
Traditional Instruments, adapted and built by Matthew Finstrom

One thing led to another. I started out beating on pie pans and cardboard boxes, then at age ten, I got a drum. Another ten years provided a large assortment of percussion instruments. Then I got a theremin. This led to a synthesizer and a piano. My musical direction changed from bombastic, rock-oriented compositions to spacey, textural stuff. Then I studied gamelan (at the University of Michigan). This really opened up some avenues for new musical exploration.

I started collecting gongs and metal objects and built a set of tubular bells. My musical direction focused more and more on the new, the avant-garde approach. Then I discovered that there were others with similar interests. I met up with James Meadows and together we came up with many new-found sounds and torture techniques to coax unusual sounds out of common instruments. Anything capable of conducting air soon found a saxophone or other type of mouthpiece attached to it. Anything with an edge was bowed. Such things as tin pie pans and plastic napkin holders became serious concert instruments.

One day James showed me a shakuhachi he had made. I immediately became interested in the tonal possibilities of bamboo. There was an empty lot which had become an extensive bamboo grove. The local zoo had been cutting bamboo there for several years to feed their red pandas. Conveniently, they only cut down the parts with branches, leaving an assortment of lengths curing in the field, with roots intact. After three laborious hours of hacking and digging, we removed some sixty pieces (all dead, of course) and set about making an amazing array of bamboo flutes. All had shakuhachi-type mouthpieces but with varying lengths, curves and diameters. The root balls were ground down to varying degrees; some into beautiful round buttons, others left as grotesque appendages. Some poles were four to six feet long and didn't employ any fingerholes. By overblowing, a large harmonic series can be played on these tubes.

We began recording in stairwells and other spacious, echoey places to enhance the sound of the overtones. During concerts, the set of bamboo flutes was laid out horizontally so that it could also be played as a giant bamboo xylophone.

Then we discovered gourds. She started it all. Minnie Black, that is. James showed me an article in the paper about a folk festival in Norris, Tennessee, where Minnie was going to display her gourd craftwork, including musical instruments. We were amazed at the rich variety of tones and textures that emerged from seemingly simple gourd constructions. We were also very delighted to meet Minnie, who shared our goal: to create new instruments. Shortly thereafter, we went to visit Minnie at her home. I purchased a large bass fiddle made out of two enormous gourds. We also got some seed and a few gourds to get started in instrument building.

Our next concert featured gourd instruments. We had a saxophone and a bassoon made from gourds and Minnie's bass fiddle, and also some shakers

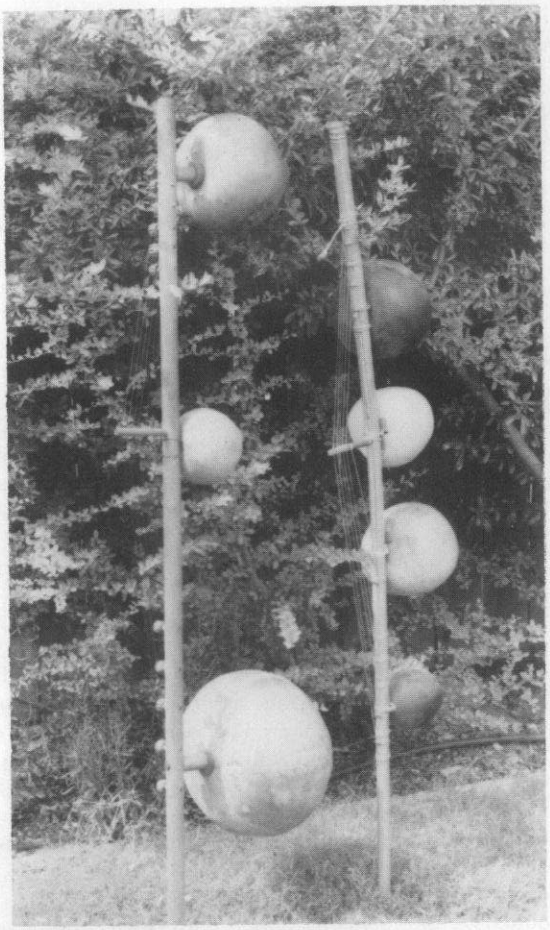
and other gourd percussion. They were an instant hit.

That year (1981), I moved out West due to a change in employment. I started growing my own gourds. My first crop yielded 175 gourds of all sizes and shapes. I began constructing primitive ethnic instruments, as I've found out that some of the neatest and most unusual sounds have been here for centuries, we've just forgotten about them... Now, I incorporate traditional instruments with modern ones in conjunction with found sounds and new techniques to create an ever-evolving style of music. Following are some notes regarding some of my recent gourd and bamboo constructions.

Mvet and Harp-Vina

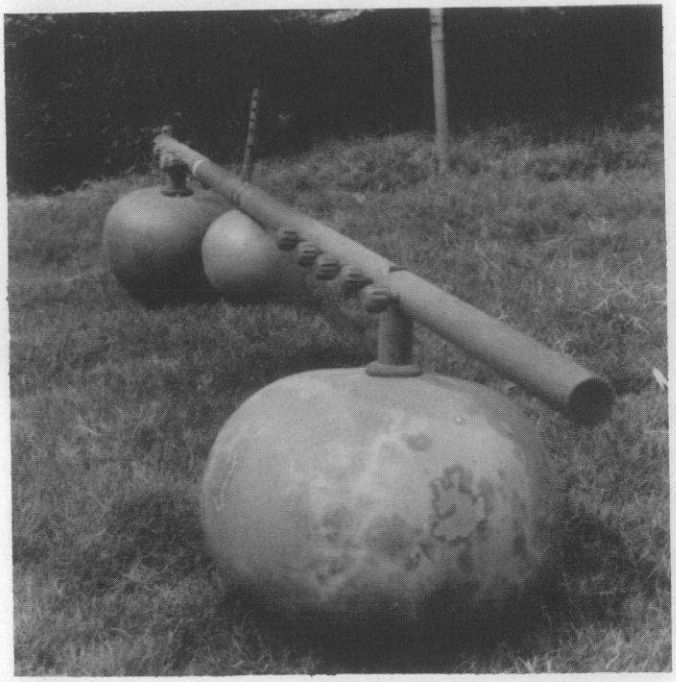
The Mvet is a type of stick zither or harp found in Cameroon and other parts of Africa. It is a unique sort of idio-chordophone in that the "strings" are merely strips of bark, cut and lifted out of the neck itself. Raffia is the material of choice. The central bridge that holds the idiochord strings away from the neck is a small stick, protruding perpendicular to the body, deeply notched to hold the individual strings at different levels. At the two ends the strings are held tight against the body by rings of fibre, and tuning is done by sliding these rings up or down over the ends of the strings. Gourds are attached for amplification. The traditional Mvet that I have is an old and fragile instrument, so I designed a modern one.

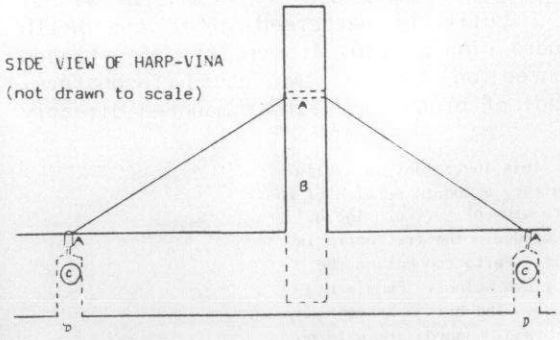
I call it a harp-vina because of the vina-like tuning pegs and the way in which the gourds are mounted on the stems. (The gourds are merely tied onto the mvet.) I used steel strings and used a double wrap around the bridge to obtain chordal discretion in tuning. In other words, tuning a string on one side of the bridge doesn't effect the opposite string, except on the lowest one which I left for the purpose of bending individual tones quickly. The beauty of this instrument is



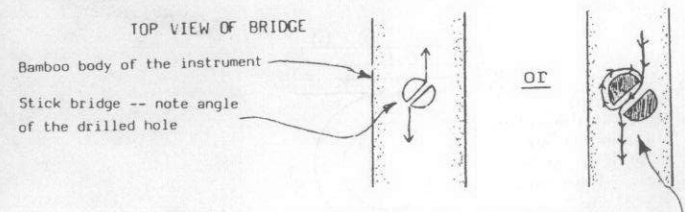
ABOVE: Harp-vina (left) and Mvet (right).
BELOW LEFT: A closer look at the harp vina.

The harp-vina, built by Matthew Finstrom, is a steel-stringed version of the mvet, a stick zither from the Cameroon. Matthew has added one extra gourd to the Cameroon mvet pictured. The harp-vina's modifications to the traditional mvet include larger gourds, steel strings, tuning pegs, brass string guides, and the method of gourd attachment. Strings pass through holes in the veritcal bridge and wind around half the bridge before going to the opposite tuning peg.





A = Brass tubing inset for reducing wear on neck and bridge, and increasing sustain
B = Bridge -- drilled rather than notched for added strength
C = Hole for tuning peg
D = Clearance channel for string windings



String wraps around bridge for discretion between tuning of string lengths on the two sides.

its ability to bend whole chords up or down with a small amount of pressure on the neck.

Virtually any two scales can be tuned simultaneously (one on each side of the bridge), and even bent in unison or separately. The tone of this instrument is unique. The gourds lend a richness of tone observed in the birimbao or the vina but with some real harmonic twisting due to its chord bending ability. Nothing I have ever heard can duplicate this sound. Tuned to evenly tempered major scales it is so rich that it's almost "too pretty." I prefer more adventurous tuning systems which make new harmonic playgrounds accessible.

Any size will probably work with this instrument. I used a six foot length of pine closet pole for the body. The largest gourd is easily removable with a wingnut (inside) for delicate transport (small cars, etc.). The whole instrument is lightweight and may be held birimbao-style for playing, or, with one end firmly on the ground, pressure may be applied to the neck to raise or lower the pitches. There are five double strings, giving ten notes. The strings enter the neck centrally through a tiny brass tube inset and into the tuning peg in the same manner as a sympathetic string on a sitar does. The brass gives more sustain and keeps the strings from eating into the neck. I also use brass insets in the bridge, which is drilled rather than notched. All this brass helps the sustain tremendously. Use good hardwood for the pegs. If you don't have gourds, use three pound coffee cans. In fact, I'll bet an all-metal model would sound great!

Models of different size, with different string length ratios and numbers, sizes and types of strings should yield interesting results.

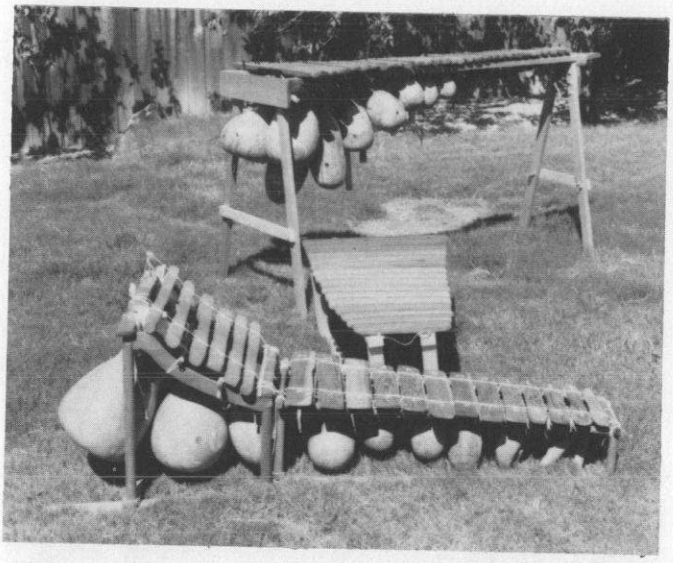
Vina

The vina is an ancient instrument which, unlike the sitar, originated in India. (The sitar originated in Persia.) There are many kinds of vinas. The one I built is patterned after the North Indian rudra vina or bin. It consists of a bamboo body mounted on top of two gourd resonators. Frets, made of brass, are either mounted directly onto the body or on top of a wooden fingerboard. The bridge rests directly on the body in either case, and is topped with horn, bone, ivory or metal. Mine is brass. The nut, tailpiece, and most of the strings are also brass.

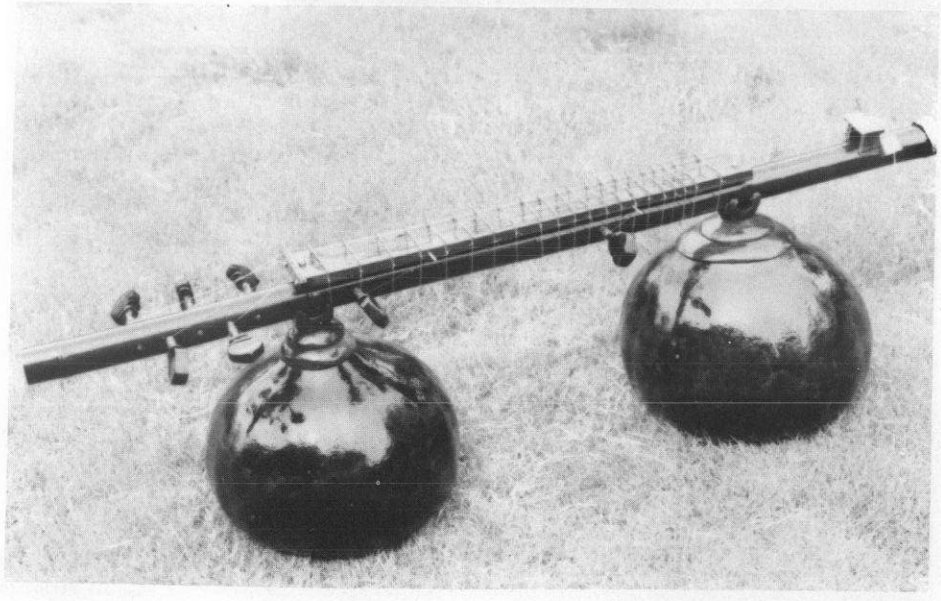
The characteristic tone of the vina comes from the slight buzzing of the strings against the broad bridge, and its precise curvature is a major determining factor. An excellent account of the bridge filing process can be found in "Djovari: Giving Life to the Sitar" by Thomas Marcotty, in The Sitar by Manfred M. Junius, p. 84 ff; Heinrichshofen's Verlag, 1974.

Balafons

The Balafon has been described at length by other authors so I won't go into their construction but will instead refer you for further information to The Mandinka Balafon by Lynne Jessop, XYLO Publications, 1983.

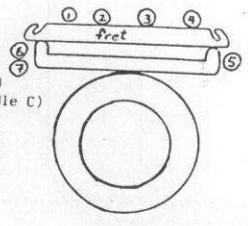


Three Balafons built by Matthew Finstrom.
Photo by Matthew Finstrom



RUDRA VINA: This instrument is similar to the bin-sitar, a modern version of the ancient rudra vina of Northern India. The body is bamboo. The fret board is made of maple. Parts connecting the gourd to body are walnut. Pegs are Macasser Ebony. The bridge is mahogany topped with brass. Gourds are held on with bolts and wingnuts and are removable. Tailpiece, nut, frets and side bridges are also brass.

STRING ARRANGEMENT AS SEEM FROM THE BACK OF THE BRIDGE:



1. Main playing string
2. Tonic (G below middle C)
3. 5th drone -1 8ve
4. tonic drone -1 8ve
5. Tonic +1 8ve drone
6. 5th +1 8ve
7. Tonic +2 8ve

As the Gourd Runneth.

THE OXFORD GOURD ENSEMBLE: A DISPERSED AND CONTINUING CONCEPTUAL PIECE WITH OCCASIONAL SITE-SPECIFIC PERFORMANCES.

By Larry Sherman

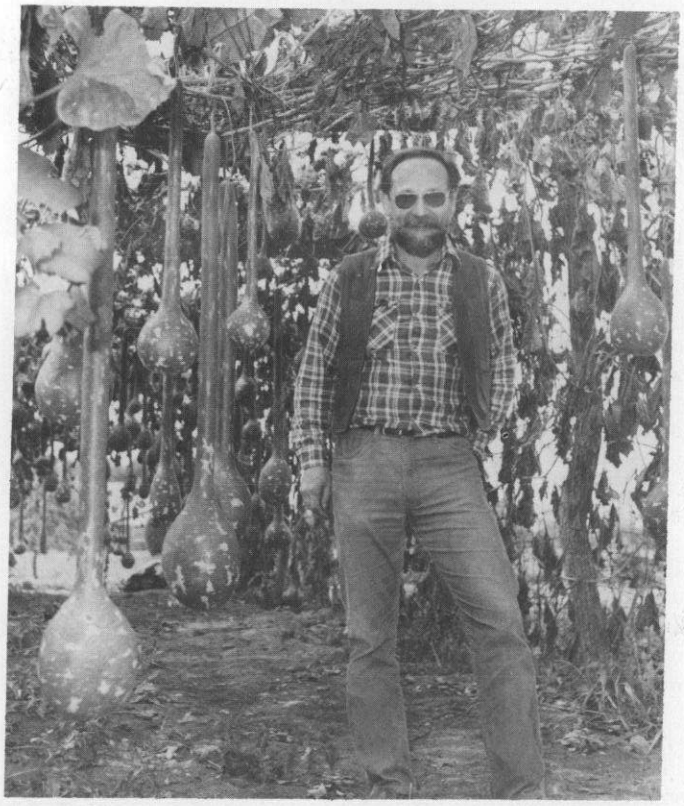
I would like to use the gourd vine as a metaphor which I believe to be appropriately descriptive of my thoughts regarding "The Oxford Gourd Ensemble." One of the more fascinating, if not frustrating, aspects of raising gourds is the vine upon which they grow. These vines may grow as long as forty feet, winding their way throughout the garden,, up trellises as well as Carl Garnett's thirty-five foot pear tree, down fence lines, across roofs, all over arbors, etc. Unattended, the vines appear to have a somewhat chaotic, if not random, will of their own. It is this aspect of the gourd which has captured my solipsistic imagination the most and has influenced the development of my "conceptual piece." One never knows where the vine will run. While I do make concrete physical objects (i.e., my gourd-crafted instruments), it is the idea of the "Dispersed and Continuing Conceptual Piece With Occasional Site-specific Performances" which is really my original (I believe) musical instrument contribution.

BACKGROUND. As an instructor of educational psychology, I have always been interested in matters of the mind. I would describe my own particular views regarding human behavior as being primarily based on theories associated with the cognitive sciences. I often use my metaphor of the running gourd vine to be exemplary of ideas associated with individual creativity. Recently, many American cognitive theorists have become highly influential, even in the world of the fine arts. They include the developmental psychologists Jerome Bruner (1986), Howard Gardner (1985), and especially the philosopher Nelson Goodman (1976; 1978; 1984). I focus on all of these individuals and their theories in my professional teaching of Educational psychology. In the fine arts, from the mid-twentieth century to the present so-called "post-modern" era, one notable reaction to the economic exploitation of artists by their agents, galleries, dealers has been for artists to focus their artistic creations on ideas rather than actual objects. This is not to say that in the past artists did not use their minds, but rather that their actual creations were more focused on physical objects rather than ideas, as such. One post-modern movement in the fine arts has been described as "conceptual art," and it could be argued that this art form has been strongly influenced by the cognitive scientists mentioned above. Of course, it could be also argued that it was the artists who influenced the cognitive scientist's views. Another viewpoint regarding the relationship between the cognitive sciences and conceptual art suggests that the disciplines are merely parallel developments, both of which are reflecting a prevailing or dominant contemporary world view. Nevertheless, as a former musician who became an educational psychologist, I could not help but see and strongly appreciate the connection between the conceptual art movement and the cognitive sciences. For further details about my views regarding these connections one might like to consult the papers from the symposium which I organized for the 5th International Conference on Humour (Sherman, 1985).

During the late 1940s and 1950s the idea or conception of a "happening" became a prominent fine art creation. One interesting result of the "happening" movement was that artists became somewhat interdisciplinary: that is, musicians (composers), theatrical performers (actors), and visual artists (painters, sculptors) began to collaborate with each other in producing their creative events, most of which assumed a great amount of indeterminacy! Nevertheless, the happenings did take place at a specified time and place (i.e., a site-specific performance), and their documentation became a historical record of the event. I suppose later references to these events may be thought of as a continuation of the event, however, I am not quite sure whether or not this was a definite intention of the artists, except in cases where the events were recorded as movies, video tapes, etc. During the late 1970s and continuing into the 1980s a new genre of fine art came to be called "Performance Art" of which Laurie Anderson and others may be considered as representative.

THE CONCEPT. The "Oxford Gourd Ensemble" was conceived about four years ago as an integration of the notions of "Happenings," "Conceptual Art" and "Performance Art." In many respects it is more an idea or concept than an actual physical object (musical instruments) or performance. It started by printing up a set of business cards on the backs of approximately 500 old IBM computer cards. In as much as I make a great variety of gourd crafted objects, not all of which are musical instruments, I simply wanted to include a unique business card with the creations which I sell. The idea of an "ensemble" has been defined as "...a unit or group of complementary parts that contribute to a single effect..." It is also used to describe a group of musicians, dancers, performers, a set of furniture, a costume or a coordinated outfit, etc. It occurred to me that if an audience suddenly became part of a performance, it too might be considered a part of the ensemble. Thus, I began to play around (think/conceive) of the Oxford Gourd Ensemble as something far more grand than a limited set of objects or people. The idea began to "run" like a gourd vine. Most art forms eventually become popularized. In this sense I consider my own work, The Oxford Gourd Ensemble, a popularized conceptual art piece.

Many people from all over the United States, and even some as far away as Israel, came in contact with the cards as they were dispersed. Some folks even began requesting site-specific performances, which I attempted to honor. While we have not done any weddings or bar mitzvahs as of this date, there have been approximately half-a-dozen site specific performances, including the 1984 Annual Gourd Peoples Breakfast in the Derrick Motel, Mt. Gilead, Ohio at the Ohio Gourd Fair (October 1984). My association with the Ohio



Gourd Society brought me into contact with Minnie Black, who sat in on this memorable site-specific performance. It was primarily through Minnie, who passed one of my cards on to Bart Hopkin, that I came in contact with the editor of **Experimental Musical Instruments.** Another memorable site-specific performance took place at Carl Garnett's farm in Oxford, Ohio, on a Sunday afternoon in July 1985. Carl, a retired elementary school principal, and his son, Don, had requested a performance for some friends who were making their first visit from Australia. The Oxford Gourd Ensemble was introduced by Carl to his Australian friends as a "traditional South Western Ohio music group." Now, I do not know how or where a "tradition" begins, but it must start somewhere, and later communication with the Australians left the distinct impression that they were truly thankful for the opportunity to have experienced some of the "...local native customs!" ...and so the vine runs.

ABOVE: The Director of the Oxford Gourd Ensemble in his gourd arbor which is 50' long, 10' wide and 7' high. The arbor is positioned on an East/West axis so that when the sun rises and sets on the Vernal and Autumnal Equinox the rays pass through the arches.

Photograph by Robert White of the Oxford Press.

BELOW: A collection of award winning fourd instruments made by the director. From left to right in the back row is a Gourd Guiro, the Talking Gourd Drum and Stereo Gourd Rattle. In the front row is the One-balled Transverse Flute, a single Pocket Palm Gourd Rattle and on the right a large Kalimba.

Photograph by John Kinne.

Another aspect of the ensemble includes the many gifts, as well as sales, of musical instruments which I have made over the years. Any of the recipients of those gourd instruments who play them are contributing to the dispersed performance. People who have been given gourd instruments include Minnie Black, several noted jazz artists including Donald Byrd, Dizzie Gillespie, Walter Davis, Naser and Salim Abdul-Alkhabyyr, and many others. Whenever any of these people play their gourds, the dispersed performance goes on, who knows where or when, running like a gourd vine... a continuing and dispersed performance.

The mere writing (by me) and reading (by you) of this article is conceived by the director of the ensemble (me) as a continuation of the "Dispersed Performance." In this sense, my real "experimental instruments" are people and their solipsistic minds, including Bart Hopkin, the editor, the editorial board and all the subscribers and other readers of EMI. I can not determine how each of you will respond to this piece or the idea of the "Oxford Gourd Ensemble," however, if you respond at all, you will have been co-opted into the ensemble as part of the dispersed performance: i.e., let us all make music together/apart. Of course, this might be somewhat unsettling to you if you feel that you are being used, but, as Kurt Vonnegut's (1959) infamous character, Beatrice Rummfoord, stated in Sirens of Titan, "The worst thing that could possibly happen to anybody would be to not be used for anything by anybody." At least if you are captured by the idea, it certainly will not be entirely harmful to your physical or mental health: if you feel some discomfort, simply disregard or forget about the concept ...prune the vine. If you are receptive to the idea, then feel free to let the vine run as far as you wish!

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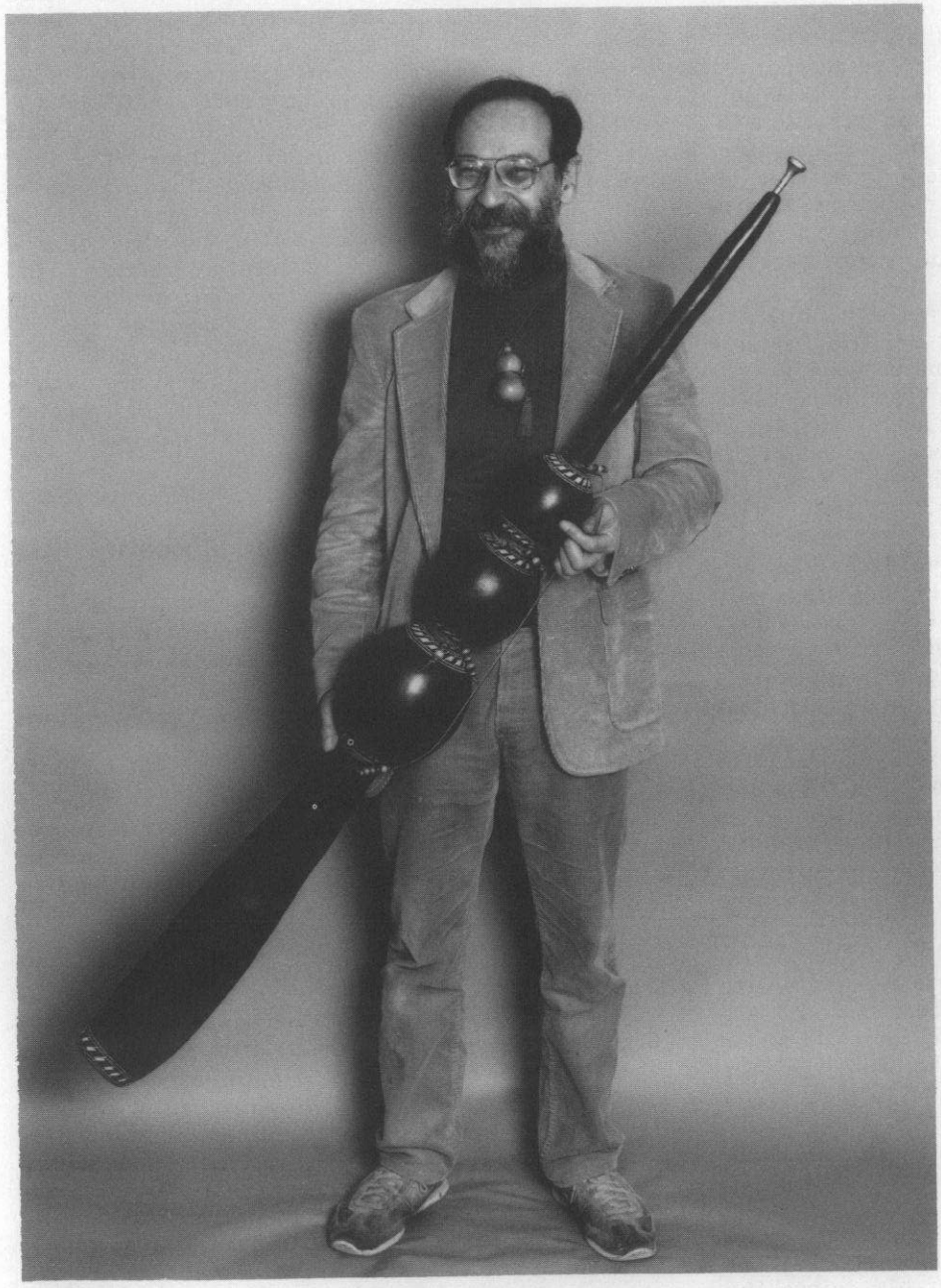

The Director holding his "three-balled gourd trumpet rattle," which was made from three soy-bean-filled cannon-ball gourds slung onto one large snake gourd. A Bach 8½D standard trumpet mouthpiece is used. The snake gourd was grown on an 8 foot arbor by Rick Keffer from New Philadelphia, Ohio. This instrument won a 1st place blue ribbon at the 1985 Ohio Gourd Fair.

Photograph by John Kinne.

BOOKS

LEONARDO DA VINCI AS A MUSICIAN
by Emanuel Winternitz
Published by Yale University Press, New Haven and London, 1982.

The image of Leonardo has come to be terribly important to a contemporary ideal of what creativity could or should be. That image, however romanticized it may be, happens to bear some affinity to the work of a lot of creative instrument builders today. Like him, we are inventors, we are visionaries with a decidedly mechanical bent, we try to bring together very disparate disciplines, and we often find ourselves pursuing plans that never come to fruition. So it should be of some interest to learn that Leonardo was an inventor of musical instruments too.

Yes, Leonardo was a musician; music was an important part of his life and his thinking. For some reason, in the mountain of modern literature on the man and his life, this fact has been largely ignored. It was not ignored by his contemporaries. His skills were highly respected; he played the lira (probably the lira da braccio), and he taught. He often addressed musical subjects in his notebooks, and many of his references are to musical instrument design. He was an improviser and did not compose on paper; accordingly, none of his actual music survives, and this may partly explain the dearth of modern recognition of his musicianship.

Now we have **Leonardo da Vinci as a Musician**, by Emanuel Winternitz, the first scholarly work devoted to this aspect of Leonardo's life. The book examines Leonardo's times, the accounts of his contemporaries, his paintings, and, most importantly, his extensive personal notebooks, to learn about the musician in Leonardo -- the theorist, the acoustician, performer, and the instrument designer.

Winternitz' task is not a simple one. Leonardo's notebooks were deliberately cryptic, with their inverted script and all. More importantly, they were not written for the purpose of communication with others; Leonardo intended them solely as notes to himself. He frequently sketched out thoughts in only the most skeletal form as he worked out ideas, or recorded brief reminders for schemes that were fully formed only in his mind. Winternitz, in elucidating this material, is often in the position of speculating on the meaning of hastily drawn, unlabeled sketches and fragmentary observations. Informed and very interesting speculation it is, and no less so for the fact that much of it is, of necessity, inconclusive. Pages from the notebook are reproduced along with Winternitz' text, and it is great fun to see Leonardo's incomprehensible configurations take on form and meaning as Winternitz interprets them for the reader.

A contemporary of Leonardo, Giorgio Vasari, described this interesting incident (quoted on page xxiv of the Winternitz book):

> At that time Leonardo, with great fanfare, was brought to the duke to play for him, since the duke had a great liking for the sound of the lira; and Leonardo brought there the instrument which he had built with his own hands, made largely of silver, in the shape of a horse skull -- a bizarre, new thing -- so that the sound would have greater loudness and sonority; with this, he surpassed all the musicians who came there to play.

The horse head lira was one instrument actually built by Leonardo. Plans for a great many others instruments, most of which were probably never built, appear in the notebooks. They included various tuned drums and mechanized drums, woodwinds and brass, string instruments and bells. Most were innovative in various ways; some were really quite advanced and did indeed foreshadow instruments and methods which would be realized centuries later in the work of other builders.

The idea to which Leonardo devoted the most space -- one which he came back to several times -- was something he came to call the Viola Organista. In its broadest conception it was a mechanized bowed string keyboard instrument. It takes several forms at different points in the notebooks, the most advanced of which involved an endless bow, presumably of some flexible fibrous material like hair, running continuously on two pulleys. A mechanism controlled by the keyboard brought individual strings in contact with this moving bow. One of the noteworthy things about this arrangement is the matter of sensitivity to touch. The keyboard mechanism is such that one can vary the pressure of contact between the string and the continuous bow, and in doing so vary timbre and volume. In the days of harpsichords and organs, such flexibility did not exist in keyboards (the narrow dynamic range and pitch-bending tendencies of the clavichord greatly restrict its practical flexibility in this regard). The piano, designed specifically to achieve fully variable dynamics, was several centuries away.

Appearing elsewhere in the notebooks are drawings of two glissando flutes. Both are clearly fipple flutes. One has two greatly elongated holes along its length, replacing the usual six or eight circular ones. The second simply has one long slit running the length of the pipe. Winternitz translates Leonardo's note accompanying the sketch:

> These two flutes do not change their tone by leaps, but in the manner of the human voice, and one does it by moving the hand up and down ... and you can obtain 1/8 or 1/16 of the tone and just as much as you want."

Another interesting drawing in the notebooks depicts what seems to be a reed instrument or flute, and beside it what clearly is a lip-buzzed brass instrument. Both look fairly normal but for the presence of another pipe parallel to the main one, with pairs of lines drawn at intervals between the main and secondary pipes in each case. On the second pipe of the trumpet there is a peculiar and rather ambiguous detail showing a row of tiny rectangles. Working from Leonardo's fragmentary notes and the drawings themselves, Winternitz comes up with this plausible interpretation: The set of rectangles represents a tiny

keyboard. The second pipe is not a sounding pipe, but a conduit for a mechanism for opening and closing pads over the tone holes, perhaps operated by wires and springs. It must be remembered that these sketches were done several centuries before Theobald Boehm; the wind instruments of the day had at most one or two pads and levers and the problem of getting acoustically correct tone holes within the reach of the fingers remained a great bugaboo in woodwinds and brass alike. Instead of envisioning the labyrinth of keys and levers we now see on the orchestral woodwinds, Leonardo devised a completely different system -- remarkably simple, flexible, and rational, and perfectly workable as well. But the instruments apparently were never built, the history of musical instruments took its course, and woodwinds now, instead of having keyboards, have dozens of exposed mechanical fingers.

The devices described above are a small sampling of the organological ideas explored in Leonardo da Vinci as a Musician. There are many more. Leonardo's mind was nothing if not prolific. Thanks to Emanuel Winternitz for making another part of it more accessible to us.

RECORDINGS

THE WAY I SEE IT AND YOU'VE GOT THE OPTION
Two Pieces by Ernie Althoff and (insert your name here)

A cassette recording produced by Rainer Linz and Ernie Althoff for NMA Publications. Available for $10 US from NMA Publications, PO Box 185, Brunswick 3056 Vic, Australia.

I would love to try to write about this cassette in a spirit that is appropriate to its contents. I couldn't possibly. Why? Because it is so profoundly peculiar. It is enjoyable, aggravating, challenging, off-putting and VERY funny in a completely idiosyncratic way. I should probably stop there and say "if that intrigues you, buy the tape."

But I will say a little more about it.

It is Side 1 of the tape that gives it most of its character. Side 1 contains the piece "The Way I See It." The sounds of "The Way I See It" are produced by a random music machine devised by Ernie Althoff, occasional sparse drum overdubs, and a spoken text. I will not attempt to describe the text.

The random music machine is an automatic percussion device, playing continuously through the piece. The sounding elements are a dozen miscellaneous objects -- some found, some contrived in various simple ways, and some actually bought as cheap musical instruments. Included are kitchen utensils, door handles, a small prepared zither, a toy drum, a casually made conduit marimba, and other odds and ends. They are scattered about on the floor or a table around the kinetic heart of the arrangement, which is an old turntable running at 16 rpm. The turntable rotates an upright post with two horizontal arms forming a T at the top. Hanging by strings from these arms at various points are a ping pong ball and two wooden beads. As they slowly circle they bonk the pots and pans, the zither, the toy drum, in completely random patterns. Each collision causes them to bounce off in some new elliptical orbit, later to strike something else and bounce again.

Althoff has arranged things so that the machine's pace of events is continuous but not crowded, inviting the listener to search for patterns that don't exist. The net effect is rather pretty actually, and also potentially rather maddening. As an environment in which to hear Althoff's eccentric text it seems strangely appropriate, both in its sonic relationship to Althoff's voice, and in the suggestion of an elusive order in randomness.

Side 2 of the tape is "You've Got the Option." It provides an effective sonic contrast to to "As I See It," though it is not as engaging in itself. It too uses a text riding on an odd, continuing musical environment, in this case provided by electronics, two half-speed accordions and some metal percussion.

In recent years Ernie Althoff has built a number of music machines similar in spirit to the one used in "As I See It." Most of them use or misuse cheap electronics, toy instruments and household items in conjunction with unlikely signal paths to produce quirky sounds with varying degrees of controllability. Some of these machines have been described, with friendly cartoon-like illustrations, in two Australian music publications: NMA2, published by NMA and available from the address given for the tape above, and AMC News #9, Spring 1985, available from the Australia Music Centre, 80 George Street North, The Rocks, Sydney NSW 2000, Australia.

NOTICES/EVENTS

THE MAKING MUSIC CONCERT SERIES

The Making Music exhibit of new and unusual instruments taking place at San Francisco's California Crafts Museum has been sponsoring a concert series. Excellent performances by Tom Nunn & Chris Brown, Susan Rawcliffe & William Wynant, and Richard Waters & Darrell Devore took place in February and early March. Before this issue appears two more will have happened: a performance by Cris Forster & the Chrysalis Ensemble, and a 70th birthday tribute to Bill Colvig featuring gamelan music from Lou Harrison, Jody Diamond, Daniel Schmidt and others. This is all very fine stuff, and we who have been able to attend and enjoy the exhibit and concerts can thank the show's hard working, imaginative and committed curator, Bill Mellintin.

NEW INSTRUMENTS / NEW MUSIC

The March installment of the "First Odd Sunday Series" featured Darrell Devore, with his many and varied instruments of cane, seed pods, bamboo, gourds and other natural materials. Everyone present took active part in making the music; everyone learned and everyone enjoyed -- a fine musical experience.

The next concert in the series will be given by Sharon Rowell & Robin Goodfellow. Sharon makes and plays beautiful multiple ocarinas; Robin makes music form all sorts of things, with an emphasis on music materials for children, young and old.

The concerts are at 1:00 pm on the 1st Sunday in odd numbered months -- that puts Sharon & Robin on May 5th -- at 3016 25th St., San Francisco, 94110. (415) 282-1562 for information.

THE LOGOS GROUP FROM BELGIUM is tentativley scheduled to appear at the same venue, Tom Nunn's Studio, 3016 25th St. in SF, on Saturday, April 11. They have done wonderful environmental interactive sound installations; they also perform with smaller instruments. For confirmation & full information, call (415) 282-1562.

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THE CATALOG FOR THE MAKING MUSIC EXHIBIT of new and unusual instruments is available from the California Crafts Museum at Ghirardelli Square, 900 North Point, San Francisco, CA, 94109; (415) 771-1919. It includes descriptions by the artists, photos, and a cassette tape of the instruments shown. Write for the price.

DID YOU GET THE EMI TAPE YET? From the Pages of EMI Volume I includes music of instruments featured during EMI's first year of publication. Great stuff! Price is $6 for subscribers, $8.50 for non-subscribers, from EMI, PO Box 784, Nicasio, CA 94946.

RECENT ARTICLES APPEARING IN OTHER PERIODICALS

Listed below are selected articles of potential interest to readers of Experimental Musical Instruments which have appeared recently in other publications.

Journal of the American Musical Instrument Society Volume XII, 1986 (c/o The Shrine to Music Museum, 414 E. Clark, Vermillion, SD 57069) has several noteworthy articles:

SARRUSOPHONE, ROTHPHONE (SAXORUSOPHONE) AND REED CONTRABASS by Gunther Joppig, while focusing on certain specific instruments, provides a fascinating general look at the seminal time in the development of modern band instruments. In doing so it provides some valuable insight into aspects of modern instrument invention and dissemination as well. The article centers on the period when Adolphe Sax was working in Paris, developing the saxhorn and saxophone instrument families among others. It chronicles the response of his Parisian competitors, the resulting sudden proliferation of new band instruments, the competition and confusion over patents and instrument names, and in general paints a picture of an inventive and lively time in the history of instruments. Many fine photographs are included.

THE FLUTES OF EL DORADO: AN ARCHEOMUSICOLOGICAL INVESTIGATION OF THE TAIRONA CIVILIZATION OF COLOMBIA, by Dale A. Olsen, concerns the beautiful clay ocarinas in human and animal shapes that have survived, many still playable, from this pre-Columbian people. The Tairona's highly developed society has not received the attention accorded the Incas, Aztecs or Maya, perhaps in part because they were one of the first to be decimated by the arrival of Europeans. Much of the article is devoted to an attempt to make sense of the scale systems found in the surviving instruments. Again, many fine photographs appear.

Finally, the AMIS Journal's "Book Reviews" section reviews the New Grove Dictionary of Musical Instruments. This three volume encyclopedic reference is unquestionably the most important publishing event in the field of organology in many, many years, and merits serious critical attention. Unfortunately it is not yet widely available in libraries, and its price puts it out of the reach of most individuals. AMIS's reviewer has done some digging to find the strengths and weaknesses of the work; in particular he points out just how much of it is new and how much reprinted directly or with modifications from the parent work, the New Grove Dictionary of Music and Musicians.

The brand new publication Pitch: for the International Microtonalist (Vol. I #1; 211 W. 108 St. #42, New York, NY, 10025) also has a review of the New Grove Dictionary of Musical Instruments, this one specifically referring to the dictionary's extended entry on microtonal instruments.

American Lutherie Number 8, Winter 1986 (8222 S Park Ave, Tacoma, WA 98408), has several items dealing with a matter that has been the source of some controversy in guitar building circles lately, namely, the non-traditional guitar designs of Dr. Michael Kasha. The items include several letters to the editor on the subject, plus articles KASHA SOUNDBOARD WITHOUT WAISTBAR by Gila Eban and RELATION OF SCIENCE TO AESTHETICS IN LUTHERIE by Dr. Kasha himself.

Vierundzwanzigsteljahrschrift der Internationalen Mautrommelvirtuosengenossenschaft (930 Talwrn Ct., Iowa City, IA, 52240), better known as VIM, has come out with its third issue. VIM is devoted to Jew's Harps and their culture. #3 contains, as usual, a mix of material on Jew's Harps from widely diverse geographical and cultural sources.